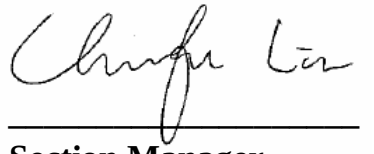
Harvatek Surface Mount CHIP LEDs Approval Sheet
Model No.: HT-V135BP

Acknowledged by



Section Manager
Production Engineering Dept.

Manager
Production Engineering Dept.

Introduction

- *The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by HARVATEK for any infringements of intellectual property or other rights of the third parties which may result from it use.*
- *Harvatek is continually effort to improve the quality of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing HARVATEK products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such HARVATEK products cause loss of human life, bodily injury or damage to property.*
- *The HARVATEK products listed in this document are intended for usage in general electronics (computer, personal equipment, office equipment, industrial robotics, domestic, etc…) These products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury.*
- *In developing your designs, please ensure that HARVATEK products are used within specified operating ranges as set forth in the most recent HARVATEK products specifications.*
- *Also, please keep in mind the precautions listed in this document.*

Product Specification

	Specification	Material	Quantity
Iv	800-1440mcd @20mA/25℃ Tolerance ±10%		
Chromaticity Coordinates	A0: A0a,A0b,A0c, A0d B5: B5a,B5b,B5c,B5d @20mA/ Ta= 25^{O} C		
Vf	2.9~3.7 (0.1V/Bin) @20mA/ Ta= 25^{O} C Tolerance ±0.05V		
Ir	< 100 µA @ V_R = 5 V		
Resin	Amber	Epoxy resin	
Carrier tape	According to EIA 481-1A specs	Conductive black tape	2000pcs per reel
Reel	According to EIA 481-1A specs	Conductive black	
Label	HT standard	Paper	
Packing bag	220x240mm	Aluminum laminated bag/ no-zipper	One reel one bag
Carton	HT standard	Paper	Non-specified

Others:

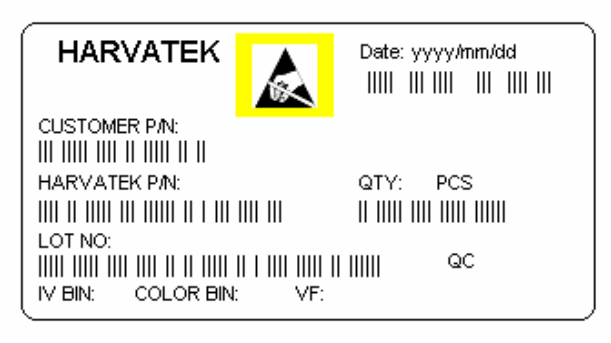
Every mid-box will be loaded 5 reels. These 5 reels can be different in lot, Iv, lambda, or Vf. Every reel will have an independent label to identify its specification and the mid-box there will have a corresponding label post on it.

ATTENTION: Electricstatic Discharge (ESD) protection

The symbol shown on the page herein to introduce 'Electro-Optical Characteristics'. ESD protection for GaP and AlGaAs based chips is still necessary even though they are safe in low static-electric discharge. Parts built with AlInGaP, GaN, or/and InGaN based chips are **STATIC SENSITIVE devices**. ESD protection has to considered and taken in the initial design stage.

If manual work/process is needed, please ensure the device is well protected from ESD during all the process.

Label Spec.:



■**Customer P/N: To Be Defined**

■ **Harvatek P/N**

H T - V 1 3 5 BP

Series Name	Emitting Color
HT-V135: 4.0 x 1.4 x 0.8mm	BP:White@20mA

■ **Lot No.**

1	2	3	4	5	6	7	8	9	10
P	**1**	**2**	**2**	**3**	**0**	**A**	**-**	**D**	**T**

Code 1	Code 2	Code 3	Code 4, 5	Code 6, 7	Code 9	Code 10
	Mfg. Year	Mfg. Month	Mfg. Date	Lots	Resin Color	Packaging
Internal Tracing Code	1: 2001 2: 2002 3: 2003 4.2004 …..	1: Jan. 2: Feb. …. 9: Sep. A: Oct. B: Nov. C: Dec.	1~31/ (30)	01~99, A,B,C…	D: Milky diffused	T: Taped Reel

■ Iv Bin:

Color	Bin Code	Spec. Range
White	X21	800-850
	X22	850-900
	Y11	900-950
	Y12	950-1000
	Y21	1000-1050
	Y22	1050-1125
	Z11	1125-1200
	Z12	1200-1270
	Z21	1270-1350
	Z22	1350-1440

Luminous Intensity Measurement Allowance is ±10%

■ Color Bin:

B5A	
x	y
0.296	0.276
0.2915	0.2855
0.3002	0.295
0.3035	0.285

B5B	
x	y
0.3035	0.285
0.3002	0.295
0.309	0.3045
0.311	0.294

B5C	
x	y
0.2915	0.2855
0.287	0.295
0.297	0.305
0.3002	0.295

B5D	
x	y
0.3002	0.295
0.297	0.305
0.307	0.315
0.309	0.3045

A0A	
x	y
0.28	0.248
0.272	0.258
0.281	0.274
0.288	0.262

A0B	
x	y
0.288	0.262
0.281	0.274
0.29	0.291
0.296	0.276

A0C	
x	y
0.272	0.258
0.264	0.267
0.274	0.286
0.281	0.274

A0D	
x	y
0.281	0.274
0.274	0.286
0.283	0.305
0.29	0.291

ASA	
x	y
0.255	0.255
0.255	0.27
0.27	0.27
0.27	0.255

ASB	
x	y
0.27	0.255
0.27	0.27
0.285	0.27
0.285	0.255

ASC	
x	y
0.255	0.27
0.255	0.285
0.27	0.285
0.27	0.27

ASD	
x	y
0.27	0.27
0.27	0.285
0.285	0.285
0.285	0.27

SUA	
x	y
0.26	0.225
0.27	0.225
0.27	0.24
0.26	0.24

SUB	
x	y
0.27	0.225
0.285	0.225
0.285	0.24
0.27	0.24

SUC	
x	y
0.26	0.24
0.27	0.24
0.27	0.255
0.26	0.255

SUD	
x	y
0.27	0.24
0.285	0.24
0.285	0.255
0.27	0.255

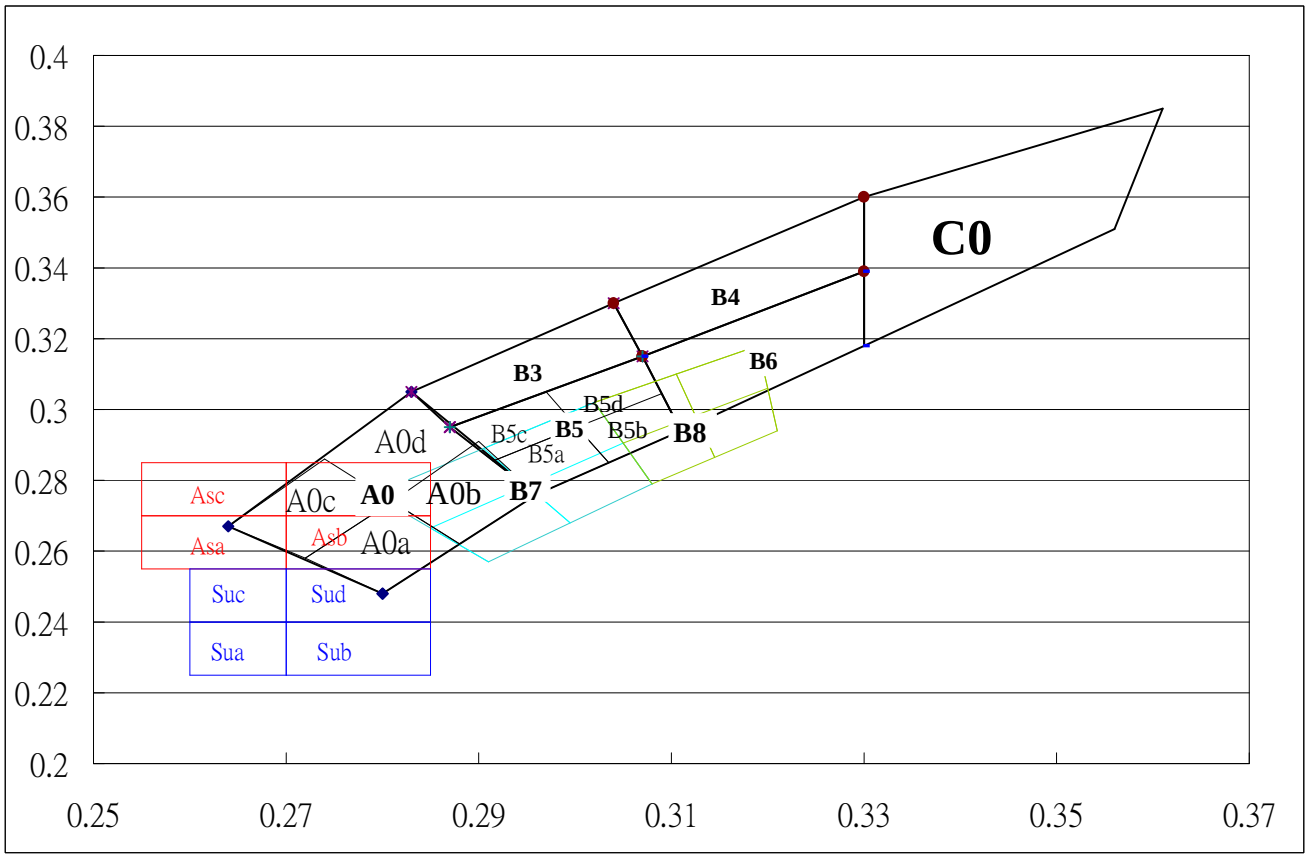
Color Coordinates Measurement Allowance is ±0.01

■ **Vf Bin:**

Color	Bin Code	Spec. Range
White	H2	2.9-3.0V
	H3	3.0-3.1V
	H4	3.1-3.2V
	J1	3.2-3.3V
	J2	3.3-3.4V
	J3	3.4-3.5V
	J4	3.5-3.6V
	K1	3.6-3.7V

Forward Voltage Measurement Allowance is ±0.05V

Chromaticity diagram



Product Specification

Electro-Optical Characteristics

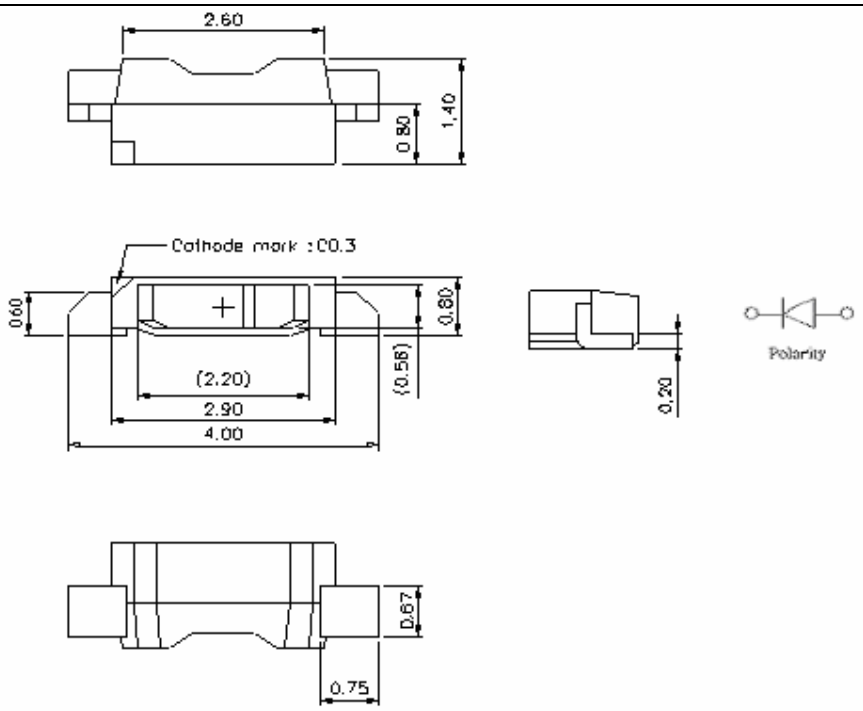
(I_F @ 20mA, T_a 25°C)

Product No.	Lighting Color	Material	V_F(V)		λ (nm)			I^*_V(mcd)	
			min	max	λ_D	λ_P	△λ	min	max
HT-V135BP	White	GaN	2.9	3.7	X=0.30 Y=0.31	--	--	800	1440

Package Outline Dimension

Unit: mm Tolerance: +/-0.1

Outline Dimension：



Unit: mm

Soldering terminals may shift in x, y direction.

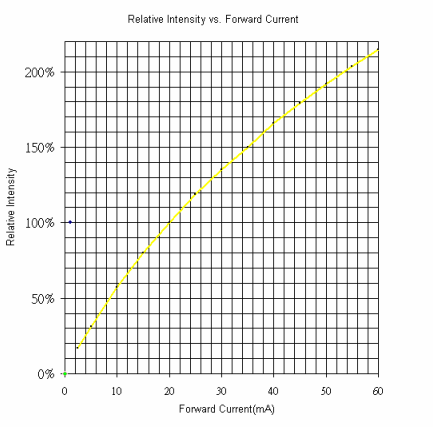
Absolute Maximum Ratings

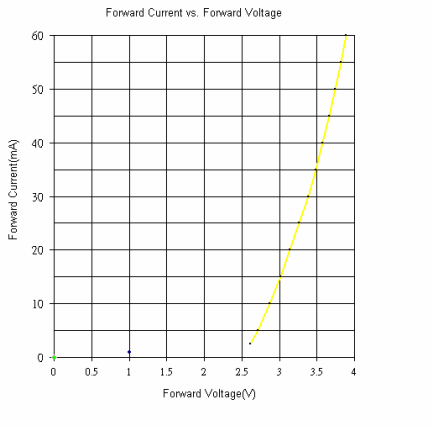
(T_a 25°C)

Series	P_d (mW)	I_F (mA)	I_{FP} (mA)	Ir (μA) @ V_R = 5 V	T_{OP} (°C)	T_{ST} (°C)
HT-V135 InGaN	74	20	70**	<20μA	-30~+85	-40~+100

** Condition for I_{FP} is pulse of 1/10 duty and 0.1msec width. ESD HBM: ±2000V

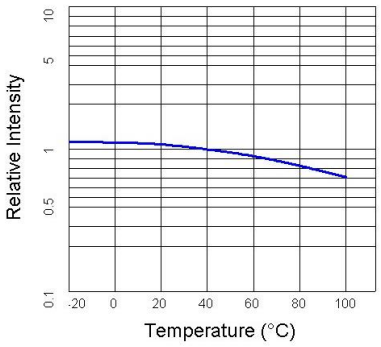
Characteristics of HT-V135 Series



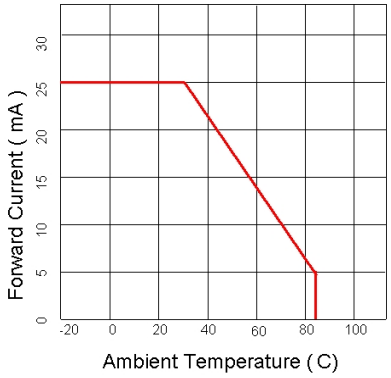


Relative Intensity vs. Ambient Temperature

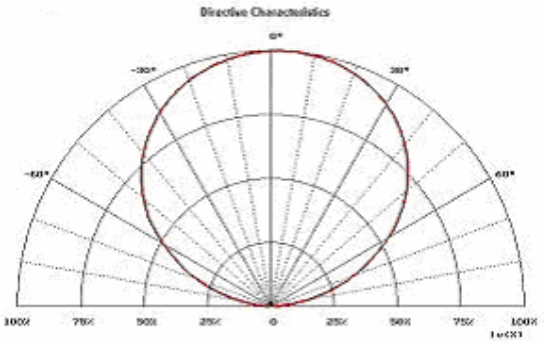
Plused 20mA; 300us pulse, 10ms peroid



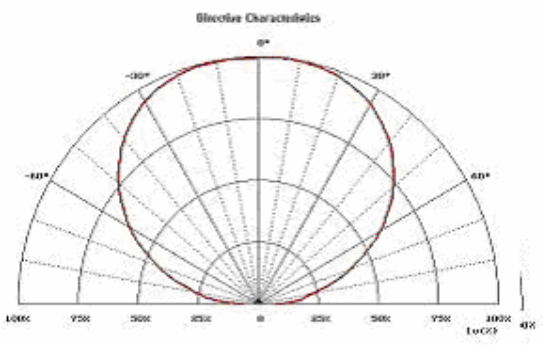
Forward Current vs. Ambient Temperature



Directive Characteristics

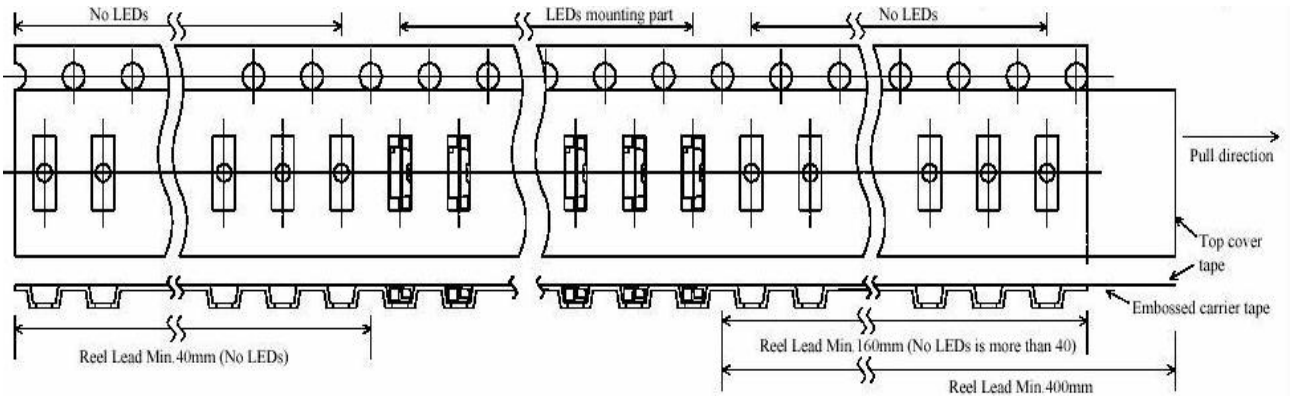


Directive Characteristics



Packaging Tape, Reel, and Packing Model

Carrier Tape Dimensions

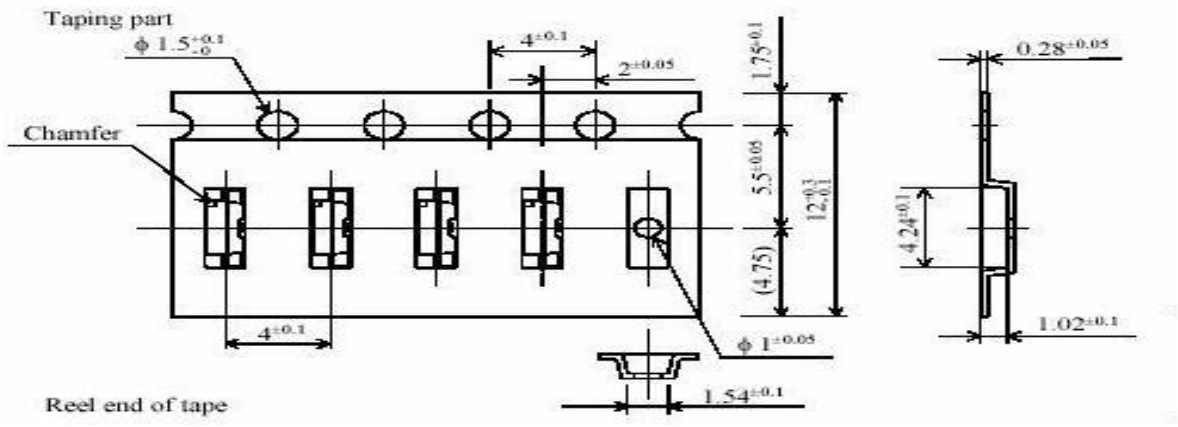


Unit: mm Tolerance: + / - 0.1

Part No.	Dim. A	Dim. B	Dim. C	Q'ty/Reel
HT-V135	4.30±0.10	1.65±0.10	1.00±0.10	2K

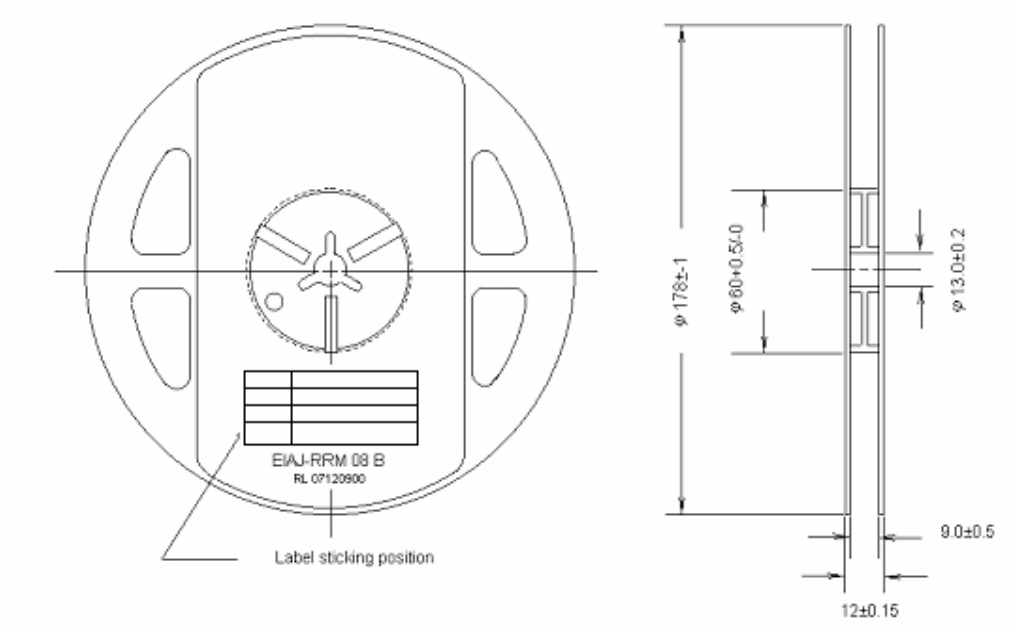
Unit:mm

Tape Leader and Trailer Dimensions

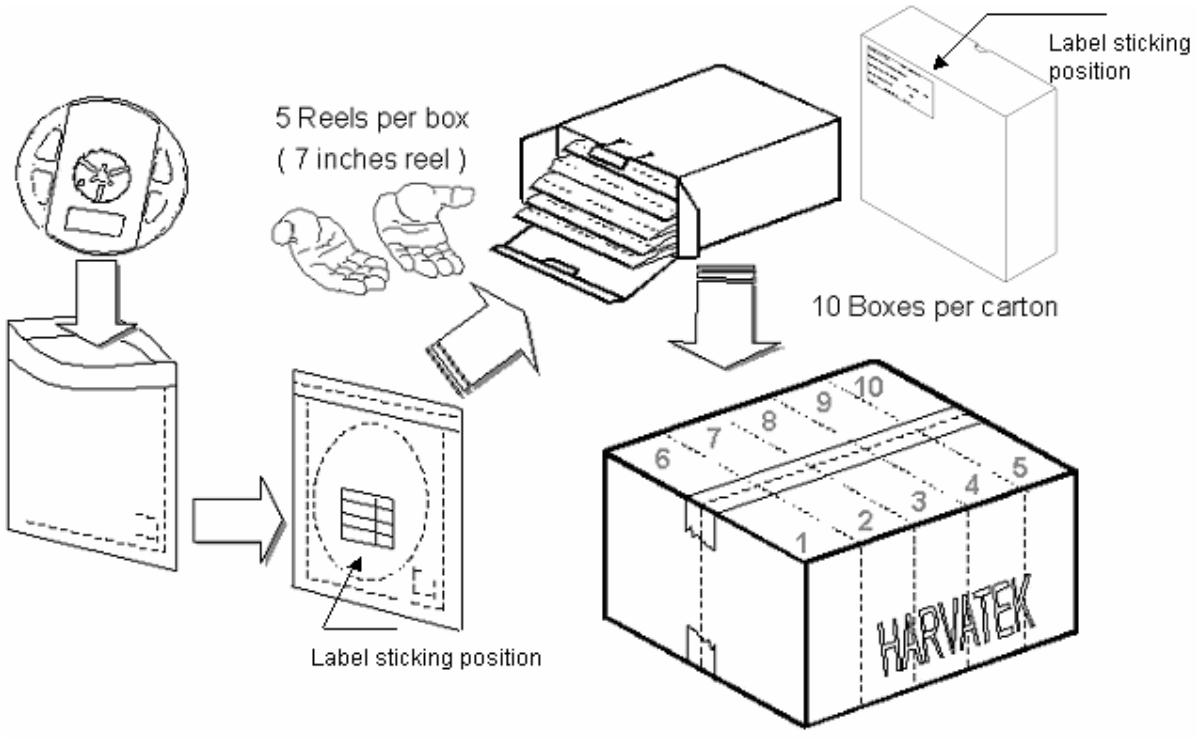


Unit: mm Tolerance: + / - 0.1

Reel Dimension



Packing Model



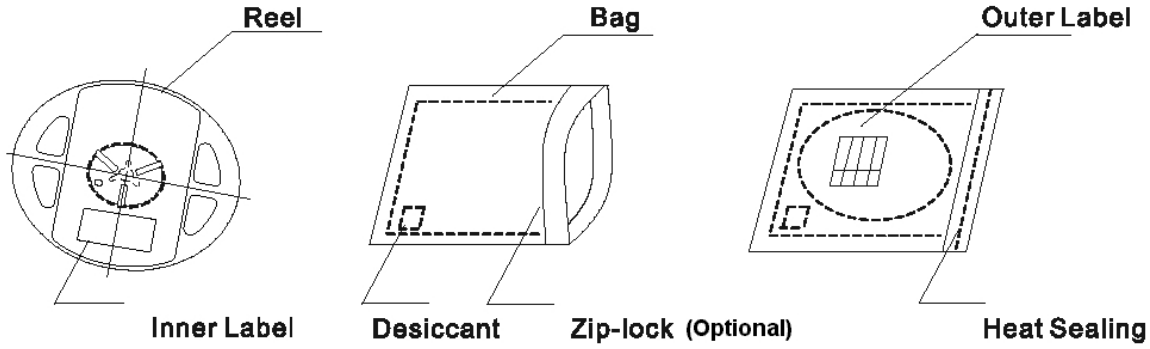
5 boxes per carton is available according to shipping quantity.

Dry Pack

Any SMD optical device, like this chip LED, is **MOISTURE SENSITIVE device**. Avoid absorbing moisture at any time during transportation or storage. Every reel will be packaged in the moisture barrier anti-static bag (Specific bag material will depend upon customers' requirement or option). And the bag is well sealed before shipment.

By customer's requirement, we will put a humidity indicator in each moisture barrier anti-static bag before shipment.

The package is the following:



Cautions of Pick and Place

It should be avoided to load stress on the resin during high temperature.

Avoid rubbing or scraping the resin by any object.

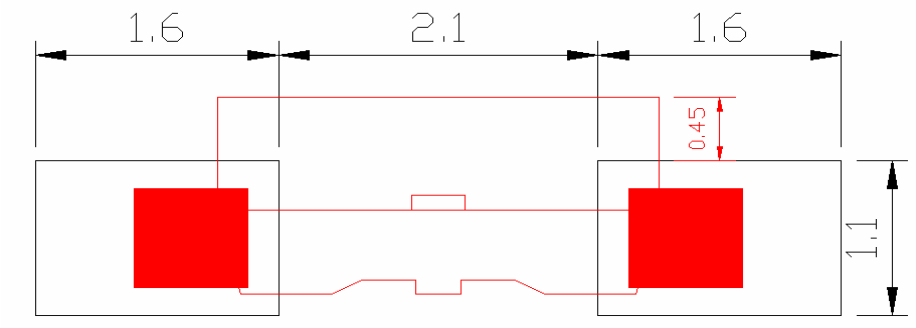
Electric-static may cause damage to the component. Please confirm that the equipment grounding well. Using an ionizer fan is recommended.

PRECAUTIONS

1. Avoid absorbing moisture at any time during transportation or storage.
2. Anti-Static process is needed especially when handling GaN, InGaN, and AlInGaP products.
3. It is suggested to connect the unit with a proper series current limit resistor. Avoid driving reverse voltage over the specification of LEDs when turning the unit ON/OFF.
4. Any application should refer to the specifications of absolute maximum ratings.
5. Avoid any direct contact with the viewing area.
6. If possible, assemble the unit in a clean room or dust-free environment.

Soldering pattern

The dimensions of the recommended soldering pattern may not meet every user. Please confirm and study first before designing the soldering pattern in order to obtain the best performance of soldering. Recommended soldering pattern is listed below.



Soldering terminal may shift in x, y direction.

Reflow Soldering

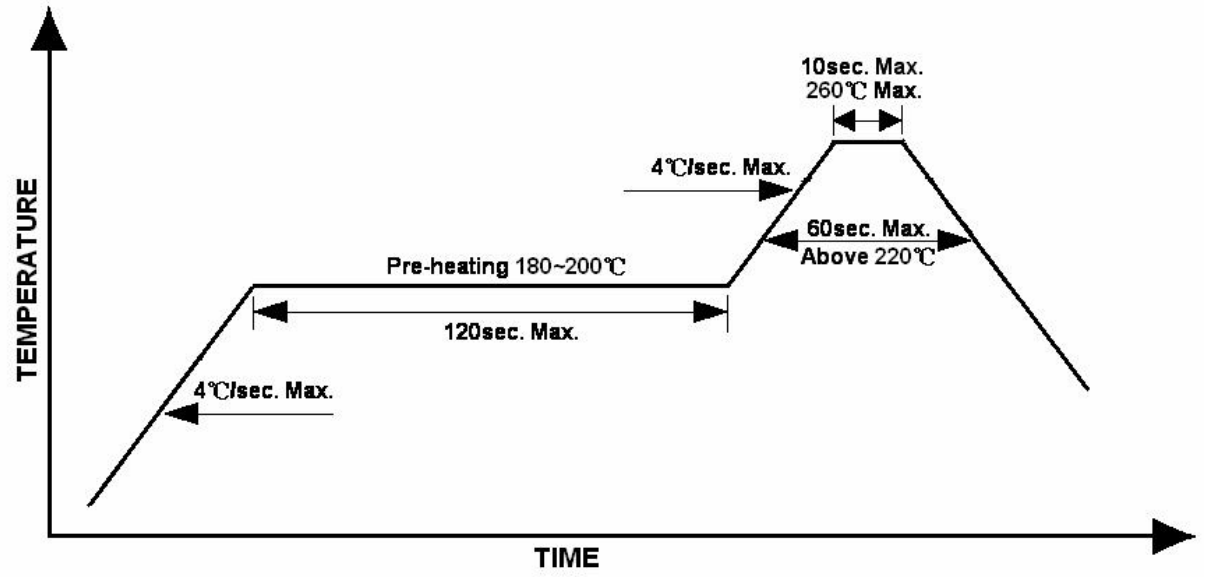
Never take next process until the component is cooled down to room temperature after reflow. The recommended reflow soldering profile (measuring on the surface of the LED terminal) is following:

Soldering temperature:

Reflow Soldering 260℃ for 10 sec

Hand Soldering 300℃ for 3 sec

Temperature Profile (Lead-free Solder)



Cleaning

The conditions of cleaning after soldering:

An alcohol-based solvent such as isopropyl alcohol (IPA) is recommended.

Temperature×Time: <50 ^{O}C×30sec, or <30 ^{O}C×3min

Ultra sonic cleaning: < 15W/ bath; Bath volume: 1liter max.

Curing: 100 ^{O}C max, <3min

Do not contact with component on the assembly board.

Cautions of Pick and Place

It should be avoided to load stress on the resin during high temperature.

Avoid rubbing or scraping the resin by any object.

Electric-static may cause damage to the component. Please confirm that the equipment grounding well. Using an ionizer fan is recommended.

Re-work

Keep the temperature on the edge of iron at 300℃±5℃ and apply for 3 seconds

Reliability Test

Item	Frequency/ lots/ samples/ failures	Standards Reference	Conditions
Precondition	For all reliability monitoring tests according to JEDEC Level 2	J-STD-020	1.) Baking at 85°C for 24hrs 2.) Moisture storage at 85°C/ 60% R.H. for 168hrs
Solderability	1Q/ 1/ 22/ 0	JESD22-B102-B And CNS-5068	Accelerated aging 155°C/ 24hrs Tinning speed: 2.5±0.5cm/s Tinning: A: 215°C/ 3±1s or B: 260°C/ 10±1s
Resistance to soldering heat		CNS-5067	Dipping soldering terminal only Soldering bath temperature A: 260+/-5°C; 10+/-1s B: 350+/-10°C; 3+/-0.5s
Operating life test	1Q/ 1/ 40/ 0	CNS-11829	1.) Precondition: 85°C baking for 24hrs 85°C/ 60%R.H. for 168hrs 2.) T_{amb}25°C; I_F=20mA; duration 1000hrs
High humidity, high temperature bias	1Q/ 1/ 45/ 0	JESD-A101-B	T_{amb}: 85°C Humidity: 85% R.H., I_F=5mA Duration: 1000hrs
High temperature bias	1Q/ 1/ 20	HT specs.	T_{amb}: 55°C I_F=20mA Duration: 1000hrs
Pulse life test	1Q/ 1/ 40/ 0		T_{amb}25°C, I_f=20mA,, I_p=100mA, Duty cycle=0.125 (tp=125 μs,T=1sec) Duration 500hrs)
Temperature cycle	1Q/ 1/ 76/ 0	JESD-A104-A IEC 68-2-14, Nb	A cycle: -40 degree C 15min; +85 degree C 15min Thermal steady within 5 min.. 300 cycles 2 chamber/ Air-to-air type
High humidity storage test	1Q/ 1/ 40/ 0	CNS-6117	60±3°C 90+5/-10% R.H. for 500hrs
High temperature storage test	1Q/ 1/ 40/ 0	CNS-554	100±10°C for 500hrs
Low temperature storage test	1Q/ 1/ 40/ 0	CNS-6118	-40±5°C for 500hrs